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INTEGRAL is an observatory with multiple instruments: a gamma-ray spectrometer (20 keV - 8 MeV, SPI), an imager (15 keV - 2 MeV, IBIS), an X-ray monitor (3 - 25 keV, JEM-X), and an optical monitor (V band, OMC). Our group requested and obtained follow-up observations of the LIGO/Virgo candidate NS merger G298048 (GCN 21505, 21506).

The initial observation was centered on the best Fermi/GBM localization, RA=176.8, Dec=-39.8 (GCN 21509), and was carried out from 2017-08-18 08:17:51 to 2017-08-18 12:36:11 for a total observing time of 14.8 ks. It covered 72% of the Fermi/GBM localization probability but only a negligible fraction of the current LIGO/Virgo localization. We do not detect any new sources in the complete IBIS/ISGRI (20-80 keV and 80 - 300 keV) and JEM-X (3-10 keV, 10 - 25 keV) mosaicked images, with a best sensitivity of 7.9 mCrab (1.2×10^{-7} erg/cm²/s) in the 20 - 80 keV energy range.

The main part of the INTEGRAL follow-up observation was centered on the candidate optical counterpart SSS17a (RA=13:09:48.089 Dec=-23:22:53.35; GCN 21529). This observation spanned from 2017-08-18 12:45:10 to 2017-08-23 04:07:47 (starting about 24 hours after the LIGO/Virgo event), with a maximum on-source time of about 330 ks (depending on the instrument).

SSS17a was in IBIS and SPI FoV in each of the dithered single pointing that make up an INTEGRAL observations; whilst it was in the JEM-X FoV only a fraction of the time.

We investigated the complete observation mosaics of ISGRI, SPI, and JEM-X data. INTEGRAL provides the most stringent constraint on any possible emission associated with SSS17a above 80 keV. We do not detect the source in any energy ranges of any of the INTEGRAL instruments, and set the following 3-sigma upper bounds for an average flux of a source at the position of SSS17a:

JEM-X:

3-10 keV: 1.2 mCrab (1.9×10^{-11} erg/cm²/s)
10-25 keV: 0.64 mCrab (7×10^{-12} erg/cm²/s)

ISGRI:

20-80 keV: 2.6 mCrab (3.8×10^{-11} erg/cm²/s)

80-300 keV: 6.2 mCrab ($7.1\text{e-}11$ erg/cm²/s)
300-500 keV: 291.6 mCrab ($1\text{e-}9$ erg/cm²/s)

SPI:

20 - 80 keV: 7.2 mCrab ($1.1\text{e-}10$ erg/cm²/s)
80 - 300 keV: 24 mCrab ($2.8\text{e-}10$ erg/cm²/s)
300 - 500 keV: 175 mCrab ($6.1\text{e-}10$ erg/cm²/s)
500 - 1000 keV: 770 mCrab ($3.1\text{e-}9$ erg/cm²/s)
1 MeV - 2 MeV: 1.0 Crab ($3.3\text{e-}9$ erg/cm²/s)

We have also searched for isolated line-like features in ISGRI and SPI data, and preliminary analysis did not identify any such features. Further analysis is ongoing.

IBIS, SPI, and JEM-X observed more than 97% of the of LIGO localization in the combined observation mosaic. We searched IBIS/ISGRI and JEM-X data for any new point source in the whole 90% LIGO/Virgo localization region, and did not find any. The sensitivity depends on the location, with the best value close to that computed for SSS17a.

Continuous observation provided by INTEGRAL allows us to perform an exhaustive search for any short (magnetar-like) or long bursts from SSS17a. We build IBIS/ISGRI light-curves in 2 energy ranges: 20-80 keV, 80-300 keV, on 100 ms, 1 s, 10 s, and 100 s time scales. The lightcurves span from 2017-08-18T12:45:10 to 2017-08-23T04:07:47 with a coverage fraction of 80%. We did not find any deviations from the background, and set a 3-sigma upper limit on any possible 1-s long burst flux of 1.0 Crab ($1.4\text{e-}8$ erg/cm²/s) in 20-80 keV, and 6.8 Crab ($7.8\text{e-}8$ erg/cm²/s) in 80-300 keV.

We also inspected the JEM-X (3-25 keV) light curves at 10 s time scale, and did not find any significant fluctuations apart from sporadic particle contaminations). The corresponding upper limit in 3-25 keV is 0.4 Crab ($1.3\text{e-}8$ erg/cm²/s).

Analysis of the PICsIT spectral-timing data with 100 s time resolution in four energy bands spanning 208-2600 keV did not reveal any significant variability associated with SSS17a during revolutions 1852 and 1853.

During these observation INTEGRAL/IBAS system identified two weak triggers (at 2017-08-22 21:05:59 and 2017-08-22 05:48:21). The localization of these events is not compatible with SSS17a. We consider these events to be noise associated with moderate solar activity.

Unfortunately, the optical camera on-board INTEGRAL, OMC, was unable to disentangle SSS17a from the host galaxy NGC4993.

We acknowledge the exceptionally efficient support by the teams at ESAC and ESOC for the scheduling of this follow-up observation.